

PATENT

Attorney Docket No. CRUI/0007

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CLAIMS

1. A downhole filter comprising a tubular member having a wall defining at least one opening, at least a portion of the opening having an outer width less than an inner width.
2. The filter of claim 1, wherein said outer width defines the minimum width of the opening.
3. The filter of claim 1, wherein said portion of said opening defining said outer width is located on an outer circumference of the tubular member.
4. The filter of claim 1, wherein the opening has a keystone form.
5. The filter of claim 1, wherein the opening is created by laser-cutting.
6. The filter of claim 1, wherein the opening is created by abrasive water jet cutting.
7. The filter of claim 1, wherein the opening is in the form of a slot and extends longitudinally of the tubular member.
8. The filter of claim 1, wherein the opening is in the form of a slot and extends

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circumferentially of the tubular member.

9. The filter of claim 1, wherein the opening is in the form of a slot and extends helically of the tubular member.

10. The filter of claim 1, wherein the opening is in the form of a serpentine slot.

11. The filter of claim 1, wherein the tubular member is diametrically expandable.

12. The filter of claim 11, wherein the wall of the tubular member incorporates extendible portions.

13. The filter of claim 11, wherein the wall of the tubular member has at least one substantially circular opening therein which opening is adapted to assume a circumferentially-extending slot-form of smaller width than the original substantially circular opening, following diametric expansion of the tubular member.

14. The filter of claim 1, wherein the wall of the tubular member defines a plurality of openings.

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15. A wellbore filter comprising a tubular member having at least one opening therethrough, the opening having a serpentine configuration.
16. A method of filtering wellbore fluids, the method comprising:
placing a downhole filter within a wellbore, the downhole filter comprising a tubular member defining at least one opening, at least a portion of the opening having an outer width less than an inner width; and
passing wellbore fluids into an interior passage of the tubular member through the opening.
17. The method of claim 16, further comprising sizing the outer width of said opening to filter wellbore particulate matter of a predetermined diameter.
18. A downhole filter arrangement comprising a tubular member having a wall defining at least one laser-cut perforation.
19. The filter arrangement of claim 18, wherein the tubular member is formed of metal.
20. The filter arrangement of claim 18, wherein the wall of the tubular member defines a plurality of laser-cut perforations.

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21. The filter arrangement of claim 18, wherein the perforation is in the form of a slot of constant width along the length of the slot.
22. The filter arrangement of claim 21, wherein the slot is of serpentine form.
23. The filter arrangement of claim 18, wherein at least the outer edges of the perforation have been quenched.
24. The filter arrangement of claim 18, wherein the perforation has an outer width less than an inner width.
25. A method of creating a downhole filter arrangement comprising laser-cutting at least one perforation in a metal filter member.
26. The method of claim 25, wherein the laser energy is controlled to cut a perforation in the form of a slot of constant width along the length of the slot.
27. The method of claim 25, comprising reducing the laser energy when the laser is stationary relative to the metal filter member.
28. The method of claim 25, comprising cutting a perforation of serpentine form.

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28. The method of claim 25, comprising cutting a perforation of serpentine form.
29. The method of claim 25, comprising quenching the metal of the filter member adjacent a cutting area.
30. The method of claim 29, comprising quenching the metal adjacent the cutting area utilising a purging gas.
31. The method of claim 25, wherein the perforation is cut to have an outer width less than an inner width.
32. An expandable downhole filter arrangement comprising an expandable base tube and a deformable filter sheet mounted around the base tube, the filter sheet defining at least one laser-cut perforation.
33. The filter arrangement of claim 32, wherein the filter sheet is of metal.
34. The filter arrangement of claim 32, wherein the filter sheet defines a plurality of laser-cut perforations.
35. The filter arrangement of claim 32, wherein the perforation is adapted to deform on diametric expansion of the filter sheet to assume the form of an elongate slot.

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36. The filter arrangement of claim 32, wherein the perforation is substantially circular.
37. The filter arrangement of claim 32, wherein the perforation is adapted to deform to assume the form of an elongate slot of width less than the diameter of the original perforation on diametric expansion of the filter sheet.
38. The filter arrangement of claim 32, wherein the perforations have a keystone section, and the filter sheet is arranged such that a smaller diameter end of the perforations is adjacent an outer face of the filter sheet.
39. The filter arrangement of claim 32, wherein the base tube is slotted.